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**ABSTRACT OF THE DISCLOSURE**

**HIGH PERFORMANCE DIODE IMPLANTED VOLTAGE CONTROLLED  
P-TYPE DIFFUSION RESISTOR**

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The present invention provides a diffusion resistor that is formed in the substrate. A diffusion region is formed within the substrate that contains first and second contact regions extending downward from the surface of the substrate. Third and fourth contacts are also located within the diffusion region between the first and second contacts and define a conduction  
10 channel therebetween. This contact also extends downward from the surface of the substrate. These contacts are connected to metal layers. The first and second contacts form the two ends of the diffusion resistor; the third and fourth contacts connect to N+p- diodes such that application of a voltage to these contacts forms respective depletion regions within the diffusion region. The depletion regions change in size depending on the voltage applied to their respective contact,  
15 thereby changing the resistance of the depletion resistor.